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AVIATION AND AIRCRAFT JOURNAL

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EDWARD P. WARNER
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CONTRIBUTING EDITORS

Vol XI December 12, 1921 No 24

The Annual Air Service Report

THE annual report of the Chief of Air Service as a separate document has been dispensed with by the War Department in the interests of economy. Excerpts will appear in the report of the Secretary of War, but no copies of the Air Service report will be available except as the Chief of Air Service cares to show the original in his office.

In a year when the Air Service has achieved certain results which have received international attention, and when aviation problems have become almost as important in themselves as those of the Army and the Navy considered separately, the public is not to be given the opportunity of reading the official records of such progress.

Economy in government printing is, as usual, starting at the point where the least economy will be secured. The amount of useless printing caused to be done by other departments of the government indicates that the pruning knife could be applied at less important objects than the report of the Chief of Air Service.

In view of the general interest the annual report of the Chief of Air Service has heretofore elicited from the aeronautical world it is to be hoped that AVIATION AND AIRCRAFT JOURNAL may be authorized to give at least a portion of this report the widest possible publicity.

Tests with Tandem Propellers

THE article dealing with the question of tandem propellers which appears in this issue makes interesting reading, particularly in connection with the Paris Aero Show, at which several airplanes fitted with tandem propellers were exhibited. Our next issue will contain a comprehensive illustrated report on this show, and our readers will be able to see for themselves how French aircraft constructors have gone about bringing the question of tandem propellers to the fore.

Without any attempt to discuss the efficiency of tandem propellers, it does appear however that the pusher in a tandem combination is not by any means as inefficient as was assumed before systematic tests were made. The principal advantage of a tandem propeller arrangement is of course that it permits of doing away with a lot of parasite resistance in the shape of separate engine nacelles. In addition through the use of tandem propellers a large increase in power can be applied in the center line (on flying boats, for instance) with the same engines which otherwise would require an outboard mounting. This has a decided advantage from the viewpoint of piloting, for twin-engined machines are not, as a rule, very easy to fly on one engine for any length of time.

As against these advantages of the tandem propeller arrangement, there is the drawback that where they are used in twin sets the defects of outboard engines not only occur again, but they are even likely to be magnified, as in the case of an entire tandem set being placed out of commission through engine trouble. How such an airplane would fly on one outboard tandem set remains to be seen, and tests regarding such an eventuality should be of considerable interest.

That some of the French aeronautical engineers are rather doubtful about twin tandem propellers affording the best solution of the multi-engine problem seems to be borne out by the comparatively large number of three-engined machines seen at the show. It is obvious that three-engined airplanes are less delicate to pilot with one engine stopped than twin-engined machines, first, because such a stoppage eliminates only one-third of the available power as against one-half, and second, because the turning moment is for the same reason much smaller. The main drawback of a three-engined combination is that it does not afford the pilot and navigator such an unobstructed field of vision as the twin-engined machines.

The Location of Air Terminals

THE cover illustration of this issue, which shows one of the Paris railroad terminals as seen from the air, may not strike the reader as having any particular connection with aviation save that it is a fine aerial photograph. However, on further reflection, the picture may assume an entirely different aspect.

Railroad terminals are, as a rule located in the heart of cities so that travelers may reach them with the least possible loss in time. If we compare this fortunate situation of theirs with air terminals, we are struck by the great distance which separates municipal and other airdromes from the city which they are supposed to serve. As a consequence the aerial traveler who may save half of his time by traveling in aircraft between two cities is likely to lose again a not immaterial amount of the time saved owing to the great distance which separates the airdrome from the city, and also because of the lack of rapid communications at such terminals.

While this question is not yet an urgent one in New York, for instance, owing to the inexistence of regular air lines, it will sooner or later assume considerable importance. Amphibians are, we believe, unlikely to afford a completely satisfactory solution of the question, because of the necessarily less efficient nature of such machines. Hence, while the Hudson may be an ideal airharbor for flying boats and amphibians engaged in coastal and river traffic, it cannot be gainsaid that the big overland air lines which some day will come into existence will require a land airdrome, possibly with a water front, to permit of the alighting of land and water machines at the same terminal. That such a terminal should have the best possible central location is obvious, and the question therefore deserves of exhaustive study.

Distribution of Load over Wing Tips and Stress Analysis

By B. V. Korvin-Kroukovsky, M.Sc.

Aeromarine Plane and Motor Co.

It is a well known fact, that load per inch run of a wing drops off in proximity of wing tip The necessity of taking this drop into account in strength computations was recognized long ago, and several approximate methods were in use. Study of pressure distribution along model wings was made by the National Physical Laboratory and led to the conclusion, that distribution of the load over a wing tip is practically independent of the plan form of the tip Accordingly a mean curve was deduced which was standardized by Technical Department in England, as the basis for strength computations This load curve is reproduced on Fig 2

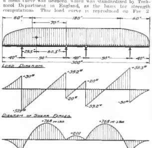

Fig. 1.

Computation of the affect of such a load distribution in each individual case would involve, however, considerable difficulties, and would require large amount of time, which fact is probably responsible for little popularity being gained by this method

However, if curves of shear force and bending moment were drawn, and were expressed in terms of chord length and loading per inch run, computations would become vary simple and short, as it will be shown in the example below

Let Fig 1 represent the distribution of load along upper wing of biplane, chord of which is 50 in. long, and let it be previously found, that total load carried by the wing is 900 lb It is required to find the load per inch run, which we shall designate by X

The load on each wing tip is variable over a length of 1.2 times the chord, i e over the length of 50 in. From the curve of shear force on Fig 2 we find, that at 1.2 chord from the wing tip shear force is equal to .99 $\times$ chord $\times$ load per inch run. Hence load carried by each wing tip is

$$0.99 \times 50 \times X = 49.5X \text{ lb}$$

Load carried by the middle part of the wing is evidently:

$$180 \times X = 180X \text{ lb}$$

Total load:

$$900 = 150X + 2 \times 49.5X = 279X$$

or

$$X = 900/279 = 3.23 \text{ lb. per inch run}$$

Bending moments and reactions of supports can be found most conveniently in terms of load of 1 lb. per inch run. Actual reactions and moments for any one condition are readily found then by multiplying results by load per inch run and by proper load factor

Upper sketch of Fig 1 shows, that outer strut is located 40 in., or 0.8 chord from the wing tip Consulting the curve on Fig 2 we find that at this distance bending moment is equal to 0.215 $\times$ Chord² $\times$ Load per inch run Hence bending moment due to overhang is:

$$0.215 \times 50^2 \times 1 = 537 \text{ in.-lb.}$$

In order to find the reactions of supports, it is necessary to find first the center of gravity of the load diagram. This

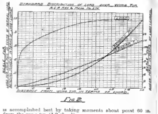

Fig 2.

is accomplished best by taking moments about point 60 in. from the wing tip (1.2 chord)

Moment due to uniform load $= 70^2/2 \quad = \quad 2450$ in.-lb.

Moment due to tip load $= 0.525 \times 50^2 = -1330$ in.-lb.

Net moment $= \quad 1120$ in.-lb.

Total load on the panel

$$0.99 \times 50 + 70 = 119.5 \text{ lb}$$

Position of C.G. $= 1120/119.5 = 9.5$ in. toward the center line of the wing (see Fig 1).

Then we find

Reaction at the strut $= 119.5 \times 60.5/90 = 80.3$ lb

Reaction at the hinge $= 119.5 \times 29.5/90 = 39.2$ lb

As computations were made for the load of 1 lb. per inch run shear is evidently equal to zero at the distance of 39.2 in. from the hinge Max. bending moment occurs at the same place and is equal to $39.2^2/2 = 768$ in.-lb.

Max bending moment in the center panel is evidently:

$$40^2/8 = 200 \text{ in.-lb}$$

With above information on hand, diagram of shear forces and of bending moments can be readily drawn, giving bending moment in any section desired.

It may be concluded from the above example, that with the curves of shear force and bending moment supplementing the load distribution curve, computations are neither longer, nor more difficult than in case of different approximate methods now in use, and have the advantage of being founded on actual test data.

The Question of Tandem Propellers

By A. Lapresle

Director of the Eiffel Laboratory

DFW Giant (Four 260 Hp. Mercedes) with Four Shaft Driven Propellers

The question of tandem propellers has not yet been approached from the theoretical viewpoint, and considerable incertitude existed with regard to their functioning until, in 1919, M. Eiffel began a series of systematic experiments.

While the National Physical Laboratory of Teddington, England, conducted an investigation of tandem propellers for the Handley-Page company, the experiments were too few in number to be considered systematic These experiments however demonstrated the fact, later verified by M Eiffel, that in a tandem propeller arrangement the two propellers must turn in opposite directions if the rear propeller is to have a satisfactory efficiency

On airplanes tandem propellers are, as a rule, driven by two identical engines. It is therefore necessary that both propellers absorb the same amount of power, from which it follows that the object of tests on a tandem propeller arrangement may be stated in the following terms

Given a tractor propeller, there is required a pusher propeller which, while influenced by the tractor, will absorb the same amount of power as the latter

The most simple means for equalizing the power of tractor and pusher in a tandem combination is to use a pusher embodying variable pitch, which will make it absorb the same amount of power as the tractor

In the case of tandem propellers driven by identical engines, and turning in opposite directions, M. Eiffel has determined the following two points

There is no advantage from the viewpoint of efficiency to give the pusher a pitch which would require the use of front and rear propellers of different diameters.

There is no advantage from the viewpoint of efficiency to give the pusher a pitch which would make it necessary to turn two propellers of the same diameter at different speeds

These conclusions have led M Eiffel to investigate the case of tandem propellers having the same diameter, and turning at the same speed in opposite directions The tests made with such a combination show that the pitch required by the pusher is, in general, about the same as that of the tractor when the latter turns at a speed corresponding to maximum efficiency The tractor, on the other hand, is but little influenced by the rotation of the pusher

In following up this investigation M. Eiffel has made a series of tests with tandem propellers between which a fuselage with its center section elements (cells) was mounted. These obstacles to the air flow modify but slightly the pitch which is required for the pusher, as may be seen from Table I

¹Translated by L. # Grey from L Aerophile

Siemens Schuckert Giant (Six 300 Hp. Basse-Selve) on which the Tractors were Driven by one Engine each, while the Pushers were Coupled to two Engines each All Propellers were Gear Driven

TABLE I PITCH REQUIRED BY PUSHER IN A TWO-BLADED TANDEM COMBINATION

Relative pitch of tractor	0.4	0.6	0.8	1.0
No fuselage between tractor and pusher	0.44	0.64	0.8	0.98
Fuselage between tractor and pusher	0.44	0.63	0.80	0.98
Fuselage and wing cell between tractor and pusher	0.48	0.69	0.79	0.97

The influence of the tractor on the pusher causes a certain decrease in efficiency of the latter. This decrease is on the average 12 per cent, 3 per cent, and 1 per cent, when the pitch of the tractor is 0.6, 0.8, and 1.0 with respect to the pusher From this it appears that the pusher is the more efficient the higher the pitch of the tractor

As tandem propeller arrangements are chiefly used on large and comparatively slow airplanes, it is likely that the propellers having a large pitch would be geared down. If the

[illegible]

designer decides that, despite the drawbacks of such an arrangement (increase in the dead weight of the power plant, dissipation of energy due to friction) geared propellers are desirable, he should establish the gearing ratio in such a way as to give the tractors the largest possible relative pitch in order to make the pushers the more efficient.

M Eiffel has found that the presence of a fuselage and of wings between tandem propellers materially *increased* the efficiency of the pusher, but he also noted that this increase was accompanied by a notable increase in the head resistance of the fuselage Therefore, until further experiments will have cleared up this delicate question, it will be best not to count upon this apparent increase in the efficiency of the pusher through the agency of the fuselage

It may be worth while in certain cases to use a tandem arrangement comprising two-bladed tractors and four-bladed pushers, like the combination used on the four-engined Handley-Page bomber Such an arrangement has the advantage of preventing, through the creation of two pulsations of different periods, the phenomena of *resonance*, which, as is well known lead to vibrations of dangerous amplitude.

As the propellers turn as a rule at the same speed, it is necessary to equalize the power absorbed by the two-bladed tractor and by the four bladed pusher by giving the latter a smaller diameter

M Eiffel investigated the combination of a two-bladed tractor of 80 cm (2 ft 7.5 in) diameter, and of a four bladed pusher of 70 cm (2 ft 3.5 in) diameter, both turning at the same number of revolutions. The pitch required by the pusher in order to make it absorb the same amount of power as the tractor are given in Table II

The efficiency of such a four-bladed pusher turning in the slip-stream of a two-bladed tractor varies approximately in the same proportion as that given above for two-bladed pushers.

TABLE II PITCH REQUIRED BY A FOUR-BLADED PUSHER OF 2 FT 3.5 IN. DIAMETER WHEN COMBINED IN TANDEM WITH A TWO-BLADED TRACTOR OF 2 FT 7.5 IN. DIAMETER

Relative pitch of tractor	0.6	0.8	1.12
Pitch required by pusher aft of fuselage	0.78	0.95	1.18
Pitch required by pusher aft of fuselage and wings	0.72	0.85	1.05

French Air Transport Leads

The following tabulation of the activities of French and other foreign commercial air services during the month of September, 1921, has been received from Capt de Lavergne, French air attaché in Washington, D. C.

PERFORMANCE OF FRENCH AIR LINES, SEPTEMBER 1921

	Trips Completed	Passengers	Freight (Kg.)	Mail
PARIS-LONDON				
Compagnie des Grands Express Aeriens	90	253	7 547	24
Compagnie des Messageries Aeriennes	114	187	5 072	101
PARIS-AMSTERDAM				
Compagnie des Messageries Aeriennes	30	161	1 278	40
PARIS-BRUSSELS-AMSTERDAM				
Compagnie Générale des Transports Aeriens	25	72	1 038	3
PARIS-STRASBOURG-PRAGUE-WARSAW				
Compagnie Franco-Roumaine	189	228	8,237	328
TOULOUSE-BARCELONA-MALAGA-CASABLANCA				
Compagnie Générale d'Entreprises Aéronautiques	185	58	1 336	878
BAYONNE-BILBAO-SANTANDER				
Compagnie Franco-Hispanique	38	27		
BORDEAUX-TOULOUSE-MONTPELLIER				
Aero Transports Ernoul	104	118		
TOTAL	712	1 104	18 509	1 177

PERFORMANCE OF OTHER FOREIGN AIR LINES IN THE CORRESPONDING PERIOD

	Trips Completed	Passengers	Freight (Kg.)	Mail
BELGIUM				
Brussels-London (Société Nationale pour l'Étude des Transports Aériens)	55	71		
GREAT BRITAIN				
Paris-London (Instone Air Line)	30	273		
(Handley Page)	48	309		
NETHERLANDS				
Amsterdam-London (Koninklijke Luchtvaart Maatschappij)	48	55		
Rotterdam-Amsterdam-Hamburg (From August 24 to Sept 24)	45	33		
SWEDEN				
Stockholm-Reval (Svenska Lufttrafik Aktiebolaget) Forjus-Saarva (to August)	22	84	1 158	

The comparison between the performance of the French and other foreign air lines is highly instructive, and shows the remarkable development civil air transport has assumed under the able guidance of the French air department.

Flying Field at Honolulu Park

In a previous issue of AVIATION mention was made of the fact that there was a possibility that Honolulu may have a municipal flying field in the near future if arrangements can be effected whereby Honolulu Park may be extended to embrace a sufficient area for taking off and landing of airplanes.

Our attention has been called to the fact that there is no municipal flying field at Honolulu and that Honolulu Park is located at Hilo, some 210 miles from Honolulu. According to latest information obtainable, the matter of the construction of a landing field at Honolulu Park has been placed before the Board of Supervisors of the County of Hawaii at their regular monthly session, and it is urged that the supervisors proceed as soon as practicable to prepare a firm and level strip of land, 600 yd long by 200 yd wide in the direction of the prevailing wind Funds required for the construction and upkeep of this landing field will, in the event the project is approved, be appropriated from the general funds of the County of Hawaii

Sport-Farman in Baltimore

The Sport-Farman two-seater, which has appeared so successfully at the New York, Kansas City and Omaha meetings, astonishing the audience with its spectacular performance, participated in the Second Exhibit of Aircraft of the American Flying Club of Baltimore held in that city on Dec 3 and 4.

W Wallace Kellett, representing the Farman Co, and Pilot D H Robertson flew to Baltimore from Philadelphia. Demonstrations of the Sport Farman are to be given at Washington and several other southern cities, where interest is keen in the performance of this little machine

The Chamberlin-Standard H5 Five-Seater

CHAMBERLIN-STANDARD MODEL H5 COMMERCIAL FIVE-SEATER (150—180 HP HISPANO-SUIZA)

Among the numerous conversions for commercial uses to which the Standard J1 training airplane has lent itself one of the most interesting is the Chamberlin-Standard five-seater produced by Chamberlin Aircraft, with headquarters at Hasbrouck Heights, N. J This firm maintains for purposes of joy riding, aerial photography and flying instruction a fleet of sixteen biplanes, mostly DH6's and Standards A few Bellanca monoplanes and biplanes are also included in their equipment, and a Curtiss MF flying boat is soon to be added to it The latter will be rebuilt to carry four passengers beside pilot by the fitting of new wings and of a 180 hp Hispano Suiza or a 170 hp Isotta Fraschini engine

The activities of the firm are conducted by Pilots C D Chamberlin, Davis and Stroop, all of whom possess a long experience in flying and in airplane maintenance The airdrome at Hasbrouck Heights, which is only 6 miles from Times Square, New York, is ideally located for civil flying as it affords landing facilities to both land and water machines.

The Chamberlin-Standard to which reference is made above, and which is known as model H5, is fitted with the Hispano-Suiza engine which develops 150 hp at 1450 r p m, and 170 hp at 1650 r p m The total wing area is 420 sq ft. and the weight empty 1650 lb Carrying 25 gal of gasoline, sufficient for 2 hr flight slightly throttled, and five persons, the weight loaded is 2575 lb This gives a wing loading of 6 lb /sq ft, and power loading of 15.1 lb /hp The fuel is carried in a 15-gal center section tank and in a 10-gal pressure tank mounted in the front cockpit With this load the machine has a high speed of 95 m p h, a cruising speed of 80 m p h., and a landing speed of 45 m p.h The climb is 5000 ft. in 12 min

For longer flights, and carrying three persons, the machine can be fitted with an additional 25-gal fuel tank. In this case the landing speed is 35 m p h and the climb 1200 ft. in 1 min

With five heavy passengers the H5 flies very well with the propeller turning at 1450 r p m, and it can climb under the same conditions at 1300 r p m Future machines of this type will be fitted with a propeller turning 1650 r p m in order to develop the full 170 hp

The principal changes in construction relative the original Standard consisted in removing the dihedral, whereby the control was greatly improved, and in washing out the ailerons, which gives the control stick more leverage At the same time all exposed wires and turnbuckles were streamlined, which materially increased the performance On new ships of this type the fuselage and the cockpit will be covered with veneer in order to increase the strength of the structure

As a certain amount of overheating was experienced with the original vertical radiator, two side radiators are now being fitted along the fuselage

The saving in weight of engine and fuel due to the use of the Hispano-Suiza enables the Chamberlin-Standard H5 to carry for the same total weight two more passengers than the Standard fitted with either the Mercedes 160 hp or the Isotta Fraschini 170 hp engine Loaded light, and with a fair breeze, the H5 has often taken off in 50 ft. and outclimbed any airplane of its class for the first thousand feet.

Canadian Airharbors

Since the publication in our issues of Oct. 17 and Oct. 24, 1921, of the list of Canadian airharbors licensed by the Air Board, Ottawa, the license No 48, issued to Niagara Air Service, 618 Dominion Bank Bldg, Toronto, Ont, for a commercial airharbor at Niagara Falls, Ont., has been cancelled Date, Oct 28, 1921

The following airharbor has been licensed under No 49, on Sept 6, 1921

Saskatoon, Sask Commercial airharbor situated 3 mi. NW of City Hall, Saskatoon Latitude 52 deg 10 min, longitude 106 deg 43 min, altitude 1650 ft above sea level Local magnetic variation 23 deg 5 min E of N Maximum dimensions for landing 300 by 400 yd Licensed for use by day only, and marked with a triangle equally divided by a vertical line (see diagram, AVIATION, Oct 17)

Water and fuel supply Facilities for running repairs only. Accommodation for two machines. Available communication to city of Saskatoon: motor transport, good roads.

Licensee R J Groome, Box 285, Regina, Sask (Y M.C A. Saskatoon, Sask)

Photographic Forest Survey

The 15th Aerial Photo Section, located at Crissy Field, Presidio of San Francisco, Calif., made a photographic survey recently covering the district between Fort Bragg, Montague, and Mather Field, Sacramento, Calif This survey is to furnish data regarding the value of forest patrol operations during the past summer.

Parachutes and Life Packs

By Floyd Smith

Concerning parachuting from aircraft, it seems that some of the most important items have not received notice.

For instance, more than 400 descents have been made with the Floyd Smith type life pack with following results

Twenty-eight descents made by totally inexperienced persons including five girls. To my knowledge three of these had never been in the air before.

Two lift off drops and one jump at less than 100 ft altitude, two jumps at 125 ft, one jump at 150 ft, two jumps at 175 ft, one jump at 200 ft., and many between 200 ft. and 300 ft. up

Two lift-off drops from wings in spin, one jump from wing in spin, and one jump and one lift off from rear cockpit in spin

Two lift off drops from rear cockpit in slip

About fifteen long falls before chute was released (known as delayed opening drops), ranging from 500 ft to 1400 ft Two released the chute while standing on the lower wing next to fuselage on JN in normal flight and pulled off under tail.

FLOYD SMITH CLIMBING INTO A NAVAL HS2L FLYING BOAT FOR A DEMONSTRATION OF HIS PARACHUTE

One accidently released extra pack while standing up in turret of a Lepere fighter and was dragged over tail, resulting in lacerated arm

Otherwise no parachute or attachment fouled any part of planes Four men were drowned by landing in water Contrary to opinion, a silk chute slides off to one side when the weight is released and lays out away from the person, and the person does not get tangled in lines until after they sink One parachute failed to open due to two lines being half hitched around all the others near the mouth of the chute in such way that it could not have happened after packing One man was killed by being blown by a 30 m.p.h. wind into a tower, striking the back of his head on a sharp stone projection

About 110 of these jumps were made with 23 ft. and 24 ft parachutes I know of only one fractured ankle and one sprained ankle from landing

From the above it appears that this type of life pack has demonstrated that it may be used under any circumstances without danger of fouling the plane It does not seem reasonable to suppose that an attached or anchored type pack could be used safely to meet several of the above tests, especially the spins. Neither does it seem that any parachute of the attached or anchored types could equal the free type at low altitudes, because the attached parachute is inherently slow in opening

Any method of positively extending the lines or of positively opening the mouth of the parachute by pulling over a hoop or bell, necessitates the falling body pulling the lines to full length before the parachute is in a position to open This results in accelerating the pull on the lines as the chute begins to open, which results in an inward pull and slow opening, and at times the vent vacuum.

In the Floyd Smith type the air strikes the parachute first, and while the lines are being stretched, the velocity of the parachute partly opens it so that the mouth is wider than any hoop or bell of practical size could make it when the lines take the load, resulting in a positive snappy opening If ordinary care is taken in coiling the lines, tangling is impossible In numerous tests where the lines were stuffed in without coiling, the worst tangles were not dangerous.

Eventually everyone who has contact with aircraft will absorb the ordinary knowledge required for the use of life packs under unusual conditions such as spins. At present the average person thinks the outside of the spin is the proper place to leave from. As a matter of fact it is practically impossible to get away from the outside, but if a person releases himself from the fuselage in rear of wings he will be thrown between inside wing and tail, far outside the spin circle

It is entirely practical in a stall fall off spin at 75 ft. height to release the parachute from the rear cockpit and be lifted out safely In fact one of the above noted drops was exactly the same thing at a greater altitude

Most persons believe that a parachute demonstrator can take advantage of certain conditions and so do the work with greater certainty and safety than it could be done in emergencies. This is erroneous, however, for the demonstrator has many problems to face, while the person in an emergency has only one

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Chicago—New York Non-Stop with Five on Board

With Eddie Stinson at the controls, and carrying four passengers, a JL6 monoplane made on Nov 25 a non-stop flight from Chicago to New York in 8 hr and 50 min

The plane left Ashburn Field, Chicago, at 7 55 a. m , and arrived at the J L Flying Field, Central Park, L. I , at 5 45 p m Pilot Stinson reported clear weather for the entire trip but extremely variable winds. Cleveland was passed over at 10 40 a m Shortly afterward Stinson got out his map of Pennsylvania, and while picking out his course for that state the map was suddenly blown out of his hands by the wind and lost He was therefore compelled to fly a compass course over Pennsylvania After one hour's flying Stinson sighted a river which he thought was the Hudson, and he followed it south in the assumed direction of New York, to shortly find himself approaching Philadelphia The river, of course, was the Delaware From Philadelphia the shortest route was followed to Mitchel Field where flares were set to light the machine in The flying distance was approximately 780 miles not including the detour made via Philadelphia

The JL6 began the flight from Chicago with 140 gal of gas in tanks, five people, spare parts consisting of four tires, two wheels one propeller and tool and motor spare parts box, 200 lb of baggage, a total of 2120 lb of useful load As the machine weighs empty 2400 lb its total flying weight was therefore 4520 lb at Chicago The gas consumed during the flight was 125 gal

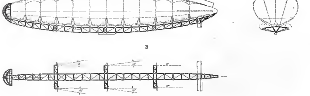
Semirigid versus Rigid Airships *

By Umberto Nobile

Director of the Italian Government Airship Factory

In connection with the first trial flight of the U. S. Army airship Roma, which took place on Nov. 15 at Langley Field, the following presentation of the advantages of the Italian semi-rigid type by Signor Nobile are of interest. Signor Nobile is with Celestino Usuelli and V. Prassone the co-designers of the Italian T type of airship, the first specimen of which is the Roma.

Following are the chief characteristics of the Roma: capacity 1,200,000 cu. ft., length 412 ft., maximum diameter 82 ft., six 400 hp. Ansaldo engines in separate power cars, driving one propeller each, total horsepower 2,400; disposable lift 16 tons, high speed 68 m.p.h., cruising range 5,300 miles, crew 12.—EDITOR.



GENERAL ARRANGEMENT DRAWINGS OF THE U. S. ARMY AIRSHIP ROMA, BUILT BY THE ITALIAN GOVERNMENT AIRSHIP FACTORY

There exist today two types of airships which are contending for supremacy: the semi-rigid Italian type and the rigid German type. The Italian semi-rigid airships comprise two sub-types: one having an articulated longitudinal beam, the other, a rigid longitudinal beam.

While for small volumes the superiority of the articulated beam type is generally recognized (and proved by the numerous requests from foreign Governments for sample airships of this type†) many experts maintain that, even for large sizes, the Italian semi-rigid type can successfully compete with the German rigid type.

Though there may be a doubt concerning the articulated type, there can be none whatever as regards the rigid girder type, as shown by the brilliant success of our experience with our first T type airship, the Roma. We are convinced that to whatever dimensions our T type may be increased (within practical limits) we shall always find that the particular characteristics which constitute its fundamentally good qualities are not only preserved, but even accentuated.

Of course, we do not say that great increase in capacity can be made without giving rise to difficulties. When the volume exceeds 3,500,000 cu. ft. the problems of construction and assemblage take on a certain importance, but though these problems may be difficult of solution they are never such as to lead to unfavorable conditions.

We consider that the essential reason why our type is superior to the German lies in the conception of the rigidity itself. In the German type the whole of the external surface is made rigid, even where the natural pressure of the gas is sufficient to preserve the shape. The Italians only make rigid those parts which really require such treatment, thus greatly simplifying construction and assembling, which more than compensates for the slight disadvantage of a less penetrating form. Moreover, as regards the preservation of the form, the rigid type does not appear to have much advantage over the Italian semi-rigid, since, with the rigid bow of the T type the excess pressure of the gas in the envelope can be maintained relatively low, without fear of any inconvenience arising either during navigation or during mooring operations.

The superiority of the Italian conception appears, however, not merely in simpler construction, but also, and more especially, in greater strength. This is evident when we compare the huge, delicate arrangement formed by the metallic framework of the Zeppelins with the strong, elastic backbone formed by the longitudinal beam of the Italian type. This backbone is strong because its parts, being relatively small and exposed to great forces, have a resistance which we seek in vain in the framework of the Zeppelin. It is elastic, because its articulated joints, the peculiar characteristic of our longitudinal beam, give it an elasticity which enables the airship to withstand shocks and bumps, while the Zeppelin, as experience has proved, cannot support such shocks without serious damage.

These are the two most important advantages of the Italian type over the German type. We may also mention the following:

1st. Rapidity and certainty in designing.

2nd. Rapidity of construction and utilization of materials of current use and constant characteristics.

3rd. Great rapidity and simplicity of mounting.

4th. Possibility of quickly dissembling the airship for purposes of storage or transport when it is not advisable to send it under its own power. We may note that the Zeppelin cannot be taken apart.

5th. Possibility in the future of assembling the airship out-

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* Excerpt from an article published in *Giornale del Genio Civile*, translated by the Paris office N. A. C. A.

† Our Airship Works have just completed an M type airship for England, and two O types, one for the United States, the other for the Argentine. Another of the same type is being built for Spain. The O type, derived from the P type, (Crocco-Ricaldoni) may be considered as the most successful of Italian small capacity airships. It was designed by Engineers Prem and Nobile.

side the hangar. In fact, the assembling of our longitudinal beam complete with all its accessories, comprising the stiffening of the bow, the power plant, rudders, etc., can be done without inconvenience in the open air if it is protected from the weather by a temporary covering of limited dimensions. When the rigid part is assembled we can, given favorable conditions and fine weather, proceed rapidly to the inflation of the envelope and to its connection with the rigid part. After this, the airship may be ready in a few days, if not to fly, at least to be moored so that the final adjustments may be made without danger.

6th Great facilities of inspection and repairing of single metallic parts. This considerable advantage arises immediately from the fact that the rigid part occupies only a small space, and also that the various parts are articulated together, so that a damaged part can easily be changed.

7th. Lower cost of construction and assembling. We need not dwell on this point. Greater rapidity of construction and

THE U S ARMY AIRSHIP ROMA IN FLIGHT

assembling together with the use of current materials must conduce to a lower cost of production

This advantage, however, must be set off against the cost of operation. As a matter of fact, in the Italian type, when from any cause, the gas bag becomes inefficient, it must be entirely renewed It is certain that to change one of the gas compartments of the Zeppelin is a much less costly operation, but, on the other hand, when we consider that the maintenance cost of the rigid portions is much less in the Italian type, we come to the conclusion that, on the whole, the upkeep of a Zeppelin is more costly than the upkeep of an Italian airship.

In summing up all the advantages of an Italian airship over a Zeppelin, we must, however, admit that in one point the latter is superior, namely, in the coefficient of head resistance. But we are convinced that this inferiority will soon be eliminated by successive improvements in the Italian type of airships.

Lectures on Commercial Aviation

There has been on the topic of aerial transportation so much false optimism on one hand and so much needless pessimism on the other that the average person is somewhat bewildered as to whether aviation is coming or going

Engineering might be called the silent profession from the reticence with which its members conduct themselves in the discussion of topics of public interest. When engineers speak therefore it may generally be assumed that the opinions put forth are derived from a careful study of actual figures.

The Society of Automotive Engineers whose membership of 5000 is composed of many of the foremost engineers and which includes in its ranks a large number of aircraft designers, will hold a series of meetings through its Sections in several cities during the next month at which various speakers will tell what has actually been done both here and in Europe in the way of commercial aviation. Authoritative figures will be given showing the number of planes now in operation, the number of miles flown during the past year, the percentage of successful flights and the number of accidents to planes attending to business, as contrasted with the much greater loss of life and limb caused by spectacular stunting or through the use of imperfectly designed machines or the operation of planes by insufficiently trained pilots

The cost of aerial transport per passenger-mile and per ton mile will also be given These figures will be obtained from flights that have actually been made on regular schedules both here and abroad

Reports indicate that the machines of one foreign manufacturer during the past summer made 693 out of 725 trips scheduled, over 95 per cent. More than 160,000 miles was flown with no accidents whatever to cargo or passengers.

The annual report of our own Air Mail Service involves a much greater mileage. Of 7,652 trips planned, 7,051 were perfectly completed, or 85 per cent. Nearly half of the flights were made under bad weather conditions. A million and a half miles were flown and about 45,000,000 letters were carried.

After recounting what has been done to date, those scheduled to give the talks at the various meetings will discuss what problems are still to be solved. Subjects that will receive attention in this connection are airways, landing-fields, ground organization, legal aspects, radio and meteorological service and the relation of civil aviation to national defense. In connection with this last subject moving pictures will be shown of the recent aerial bombing operations against the surrendered German battleships.

Those who will take part in this national program include J G Vincent, conspicuously identified with the Liberty engine; representatives of the Army and Navy Air Services, Glenn L. Martin, one of the pioneers in aviation; Ralph Upson, balloon expert, and Assistant Postmaster General Shaughnessy, who will give information about the Air Mail Service.

The following dates have been fixed definitely:

Indianapolis .... Dec. 5
Worcester, Mass. .... Dec 9
New York City .... Dec 15
Cleveland .... Dec 16
Philadelphia .... Dec. 22

Other meetings will be held during the month at Cincinnati, San Francisco, Buffalo and Detroit.

New Speed Records

The Aero Club of France has homologated the following world's speed records made during the Deutsch Cup race.

Greatest speed over 1 km 330 75 km p h. (206 m p.h.) Holder, Sadi Lecointe on Nieuport-Delage, Sept. 26, 1921.

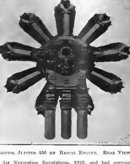
Speed over a distance of 100 km. 22 min. 5 2/5 sec. Brak Paps on Fiat, Oct. 1, 1921

Speed over a distance of 200 km. 42 min. 39 4/5 sec. G Kirsch on Nieuport-Delage, Oct. 1, 1921.

Tests of the 450 Hp. Bristol Jupiter Engine

The fact that the Bristol Jupiter aero engine has passed the British Air Ministry (March 1920) type test marks an epoch in the development of the air-cooled radial aero engine. Only two makes of engine, and these both water-cooled, have previously satisfied the rigid conditions laid down for this test The results achieved with the Bristol Jupiter engine are the more meritorious when one considers that it is the lightest proved engine of its power in existence and that it is lighter per horsepower than either of the other two makes of engine which have previously received the type test certificate

The engine upon which the tests were made has been manufactured under conditions complying with the directions of



BRISTOL JUPITER 450 HP RADIAL ENGINE. REAR VIEW

the Air Navigation Regulations, 1919, and had previously run for 17 hr and 41 min

Arrangements for Test

The power curves, 30 hr of the 90 per cent endurance test, high speed and high power tests, were carried out on a Heenan & Froude dynamometer, coupled to the engine through a special Bristol Carden shaft and universal joints. The tail extension of the dynamometer shaft is coupled through a dog clutch to a 100 hp variable speed motor. Cooling was effected by a "Sirocco" fan, direct driven by a 270 hp shunt wound motor, the fan supplying air at an average velocity of 85-90 m p h taken on the axis of the duct, 5 ft. away from the engine Twenty hours of the endurance test were carried out on the hangar with a propeller The slow running and acceleration tests were also carried out on the hangar Gasoline consumptions were measured by Mark III flow-meters, and in addition, check tests were made of the total amount of fuel used. 80 per cent Aviation, with 20 per cent Benzol mixture was used throughout the test.

Oil Consumption

A 9 gal tank fed the engine under pressure, surplus oil from the engine being returned to this tank by the scavenger pump. An electric heater controlled the oil intake temperatures.

Power Curve No. 1

On Sept. 2, 1921, the following power curve was taken

R.p m	Load on brake lb	Hp Bhp. corrd.	FUEL Total Pt.	FUEL Fuel Pt Hp /hr	B m.e p. on actual Hp. lb per sq inch	Time per reading Min	Time per reading Sec
1620	305 6	415	237	572	113 0	2	45
1564	308 5	402	235	585	116 0	2	55
1478	312 5	387 5	228	586	118 0	2	38
1380	314 3	364	217	600	119 0	2	04
1284	320 5	348	214	612	121 0	2	30
1178	326 0	321 5	205	642	123.0	2	45
1278	323 0	345 5	212	615	122 0	2	00
1353	316.5	368 5	218.5	593	119.5	2	35
1472	312.0	387	227	591	118 0	2	54
1556	307.5	404	234	584	115 0	2	38
1618	305 5	415	238	578	115 5	2	35

Barometer 29 70 inch
Weather Fine
Fuel Gasoline 80 per cent Benzol 20 per cent
Time Start 21 20 Finish 22 10

50 Hr. Endurance Test

The 50-hr endurance test was then entered upon and the following are the tabulated results

Date	Non stop Runs Hr	Non stop Runs Min	R.p.m	Load lb.	Bhp. corrd.	Oil Pres.	Oil Cons. Pt./Hp. Hr	Gasoline Pt. Hr	Gasoline Pt. Hp Hr
3 9 21	1	48	1575	282 7	347 5	33 5	054	203 0	589
3 9 21	2	20	1577	282 5	347 5	35 4	047	207 0	601
5 9 21	3	00	1576	282 5	347 0	36 5	043	203 1	588
5.9.21	5	40	1578	282 8	348.0	35 0	048	203 3	593
6 9 21	8	15	1578	283 4	347 0	35 2	050	207 3	603
7.9 21	10	30	1570	Propeller		Approx 35	—	200 1	—
8.9 21	10	00	1575	do.		Approx. 33	—	198 5	—
9 9 21			1578	282 72	340 3	33 2	048	203 0	589}
do			1577	290 2	364 3	35 0	051	223 0	595}

Slow Running Test

On Sept. 8, 1921, the following slow running test was completed:

Time	R p.m.	Oil Press.	Oil Temp	Non-stop Hr.	Non-stop Min
12 30/13 00	303	35	48	0	30

The running of the engine at these very slow revs was steady, and the acceleration good.

High Speed Test

On Sept. 9, 1921, the high speed test was completed:

Time	R p.m.	Load lb	Bhp. Actl.	Bhp. corr	Oil Pres.	Oil Temp.	Oil Pt. hr	Gasoline Pt. hr	Gasoline Pt hp. hr	Non stop hr	Non stop min	Wind speed M p.h.
18.53/ 19 33	1730	193 3	288	292	35 4	38	26 3	173	600	1	00	88

This is purely a speed test to test bearings and was done with throttle partly closed.

High Power Test

On Sept. 9, 1921, the following high power test was completed:

Time	R p.m.	Load lb	Bhp Actl.	Bhp Corr	Oil Pres	Oil Temp	Oil Pt. / hr	Oil Pt. hp hr	Gasoline Pt / hr	Gasoline Pt hp. / hr	Non-stop hr	Non-stop min	Wind speed m.p.h.
23 25/ 00 25	1623	301 5	394	393	35	51 5	21 33	054	241 3	610	1	00	88 3

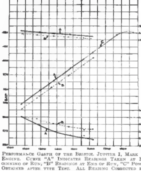
Power Curve No. 2

On Sept. 10, 1921, the second power curve was completed at the conclusion of the test as follows

R.p.m.	Load on brake lb	Hp. corrd.	Total pt. hr	Specific pt. hp./hr	B.m.e.p. on actual hp. lb sq in	Time per reading Min	Time per reading Sec.
1624	290	478	243	608	111 5	2	42
1562	297 5	392	238	671	113.5	2	46
1470	301	373 3	225	610	110 0	2	45
1364	305 2	352	218	628	116.3	2	45
1278	308 0	334	210	838	116.3	2	03
1180	313 5	313	193	640	119 0	2	30
1278	309 5	354 5	210	337	113.8	2	13
1375	308 0	363 5	215	813	115 8	2	43
1464	302 0	373 3	227	615	118 0	2	30
1570	297 0	623 0	238	608	112 0	2	32
1620	264 5	482 0	242	384	110 3	2	64

Barometer 29 54 in
Weather Fine
Time Start 00 40 Finish 01 30

* Extracts from British Air Ministry's Report



PERFORMANCE GRAPH OF THE BRISTOL JUPITER I, MARK II, ENGINE. CURVE "A" INDICATES READINGS TAKEN AT BEGINNING OF RUN, "B" READINGS AT END OF RUN, "C" POWER OBTAINED AFTER TYPE TEST. ALL READING CORRECTED FOR ATMOSPHERIC PRESSURE

Oil and Gasoline Consumption

The average oil and gasoline consumptions throughout the test were

Oil	.094 pt./hp./hr
Gasoline	.584

These figures are worthy of close attention. With engines of the air-cooled type the gasoline consumption figures have previously been very high, but the figures recorded during this series of official tests with the Bristol Jupiter engine bear favorable comparison with the consumptions recorded by modern water-cooled engines.

Dismantling

At the conclusion of the tests the engine was dismantled for examination. Very little signs of wear were visible, and the general condition of the engine was found to be excellent

Full Throttle Test

At the conclusion of the test, and without any further adjustments and replacements being made to the engine, cam sleeve (Part No. FB/2783) was substituted in the engine. This cam sleeve gives a slightly altered timing to accommodate higher engines revs. Power curve and one hour full throttle test at 1775 r.p.m. and at 1840 r.p.m. were then completed in order to ascertain the maximum power the engine would develop and to demonstrate that the engine has a good factor of safety at its rated power with the following results

Time m.	s.	R.p.m.	Load	Bhp.	Mep	Consumption	
2	25	1560	910	409	117.9	.596 pt./hp./hr	Power Curve
3	93	1660	936	426	119	.597	
2	23	1775	906	447	113.9	.57	
9	50	1979	299.8	462	111	.585	

One Hour Full Throttle at 1775 r.p.m.

Average Bhp. — 442 Average Mep. — 119 lb. per sq. in.
Oil consumption .0779 pt./hp./hr
Gasoline do .589
Corrected to 760 m/m (Barometer)

One Hour Full Throttle at 1840 r.p.m.

Average Bhp. — 450 Average Mep — 110 lb. per sq. in.
Gasoline — .586 pt./hp./hr
Oil consumption — .11 pt./hp./hr

One Hour Test Cutting out 3 Cylinders

The engine was set to run at 90 per cent of normal full power viz., 345 hp. at 1575. The gasoline from one carburetor was cut off, allowing the engine to run on six cylinders only. The engine was run 1 hr. non-stop under these conditions. Naturally there was a certain amount of vibration, but not excessive.

At the end of the hour, gasoline was turned on, and the engine picked up to full load at once. There was no oiling up of plugs. The results obtained on six cylinders were as follows:

Bhp.	199
R.p.m.	1250
Oil consumption	.0419 pt./hp./hr
Gasoline	.589

This test was also carried out under the supervision of the Aeronautical Inspection Department.

Weight

The official weight of the engine complete is 729¼ lb., excluding exhaust pipes and intakes.

Among other points which are of much importance may be mentioned that owing to the design of the induction system the engine starts particularly easily, and owing to the air-cooling it is especially suitable for starting up in very cold climates. The Jupiter engine can also be more easily and rapidly dismantled and erected than any other engine of equal power and performance, and is claimed to have 25 per cent less parts than any other engine of equal power.

Control in Circling Flight
N.A.C.A. Report No. 112

This investigation was undertaken by the National Advisory Committee for Aeronautics at the Langley Memorial Aeronautical Laboratory for the purpose of developing instruments that would record the forces and positions of all three controls, and to obtain data on the behavior of an airplane in turns All the work was done on a standard rigged JN4H (airplane No 2 of N.A.C.A., Report No 70) It was found that the airplane was longitudinally unstable and nose heavy, that it was laterally unstable, probably due to too little dihedral, and that it was directionally unstable, due to insufficient fin area, this last being very serious, for in case of a loss of rudder control the airplane immediately whips into a spin from which there is no way of getting it out On the other hand, it was found possible to fly quite satisfactorily with the rudder locked, and safely, though not so well, with the ailerons locked The value of Y_v was obtained in free flight, and when the effect of the propeller was subtracted, the agreement with the model test was excellent, but with the propeller revolving at 1350 the value of Y_v was nearly doubled. The value of L_v and N_v were little affected by the slipstream, but their values do not agree with the model test

The Minimum Induced Drag of Aerofoils
N.A.C.A. Report No. 121

The Minimum Induced Drag of Aerofoils, by Max M. Munk, helps to explain the phenomenon of flight. It contains some theorems concerning the arrangement of airplane wings which are of considerable practical interest In particular, it shows the theoretical reasons for the decrease of drag which accompanies all increase in the aspect ratio or lateral extension of a wing The efficiency of a given arrangement of wings may be calculated from the formulae derived in this paper

An Enthusiastic Aerial Passenger

Whenever opportunity offers, King Albert of Belgium always selects the air for his journeys, thereby enabling him to undertake engagements which it would otherwise be impossible to entertain On Oct 13 the King left Casablanca, Morocco, about 7 a m by the postal service airplane for Toulouse via Malaga, Alicante and Barcelona, arriving about 5 on Friday, Oct 14 At Toulouse he took the train to Paris, and after a call next day upon M. Millerand, he left LeBourget by air again, in his own airplane, and arrived at Brussels a little after 3 p m

"Who's Who in American Aeronautics"

Every week, AVIATION AND AIRCRAFT JOURNAL prints the biographical sketch of men who are prominent in American Aeronautics. These sketches will be published later in pamphlet form. As so many of the officers change their stations often, it is believed that a semi-annual issue will be necessary. In compilations of this character many errors and omissions occur. It will be appreciated if corrections are sent to "Who's Who" Editor.

William M. Conant, Jr.

CONANT, WILLIAM M. Jr., Agriculturist, born Boston, Mass., March 23, 1891 son of William M Conant, Sr and Mary (Bennett) Conant, married, Dorothea Patrick, June 4 1919

Educated Noble and Greenough private school, AB 1921 Harvard University

Professional 1912-1914, Manufacturing, 1914-1915 accounting, 1915-1917, salesman

Aeronautical Activities 1919, 1st Aero Squadron New York National Guard 1917, enlisted as cadet commissioned 1st Lieut. Oct. 1917 overseas Oct. 1917 finished training as chasse pilot at 3rd Aviation Instruction Center Issoudun Feb 1918 appointed tester on airplanes at that field April 1918 was made chief tester and promoted to Captain Oct 1918 returned to U S. Feb. 1919 promoted to Major, March 1919, on duty until discharge as executive officer, Bolling Field

Flying Rating Reserve Military Aviator

War Service Air Service, U S Army Aug 1917 to Aug 1919

War Honors Citation from General Pershing for exceptional meritorious and conspicuous service in A E F

Member Harvard Club of New York.

Present Occupation Agriculturist.

Address Elkchester, Ky

Reuben Curtis Moffat

MOFFAT REUBEN CURTIS 1st Lieut Air Service born Brooklyn N Y April 24 1897 son of Dr John Little Moffat and Elizabeth (Rhodes) Moffat.

Educated Adelphi Academy Brooklyn N Y; Ithaca High School; 1914-1917, Cornell University

Aeronautical Activities: Cornell Ground School, Dec 1917 elementary training Kelly Field No. 2 Feb. 1918 Camp Dick Post Field Taliaferro Field Observation Pilot, 8th Aero Squadron Nov 1918 to Feb 1919 Mitchel Field Hazelhurst Field Assistant Dept Air Officer commercial flying in Georgia Alabama Massachusetts and Maine Assistant Air Officer, First Corps Area, Oct 1920 to date

Flying Rating Reserve Military Aviator, Feb 1918

Member Massachusetts Aero Club

Present Occupation 1st Lieut Air Service

Address H Q First Area, 99 Chauncey St., Boston Mass home, 199 Union Ave, Framingham, Mass

Leonard Anderson Mack

MACK, LEONARD ANDERSON Manufacturer born, Wellmanville, Kans., Dec 23 1894 son of Orel Henry Mack and Sarah Emaline (Anderson) Mack married, Helene Seeger Nov 9 1920

Educated Grammar and high schools two years college.

Professional Standard Oil Co.; with saw mill company

Aeronautical Activities: Ground School University of California May 1918, training at Camp Dick and Post Field

War Service Army May 1918 to Dec 1919

Present Occupation Fruit Growers Supply Co (Saw Mill)

Address P O Box 1009 Susanville, Calif home 429 Hill St., Reno, Nev

Franklin Case Davies

DAVIES FRANKLIN CASE, Student born Racine Wis., Sept. 26, 1899 son of John P Davies and Lillie E Davies.

Educated: Racine grade and high schools, University of Wisconsin

Aeronautical Activities Instructor at Junior Plattsburg Camp summer of 1919 passenger carrying at Lake Placid, N Y and Plattsburg, N Y, until middle of Sept. 1919 testing for Curtiss N Y Aircraft Corp. and passenger carrying through N Y and N J, summer of 1920

Flying Rating: Reserve Military Aviator June 1919 (No 2044)

War Service Army Nov 1918 to June 1919

Present Occupation Student.

Address 16 Mendota St., Madison Wis., home 744 College Ave., Racine Wis.

Theodore A. Baldwin, Jr.

BALDWIN THEODORE A Jr. Colonel Air Service, born Fort Sill, Indian Territory Aug 1 1878 son of Theodore A Baldwin Sr and Cecelia (DeJean) Baldwin married, Agnes Judge, 1929

Educated Lake Forest Academy Lake Forest, Ill. Mass Inst. of Tech Infantry and Cavalry School 1906 Army Staff College 1907

Professional Entered U S Army, 1899 with 6th Army Corps in Cuba in the battle of San Juan Hill assigned to 24th Inf and on duty with same until 1905 on duty at Army School of Line and Staff Colleges 1905-1907, Captain 9th Inf, 1905-1907, Captain, 26th Inf 1907 1912 Captain Quartermaster Corps, 1912-1916 Captain, 2nd Inf 1916-1917 Major, 1st Inf 1917 Lt Col National Army 1917; Lt. Col. Air Service, 1917-1918 Colonel Air Service 1918

Aeronautical Activities Detailed to Air Service Oct 1917 proceeded with A. E F to France same month Personnel Officer Air Service, A E F Assistant to Chief of Air Service A. E F until July 1918 in command of Orly Field France from July 1918 to April 1919 Chief of the Property Division Off Chief of Air Service Washington D C. May 1919 to Oct. 1920 student Fort Omaha, and Ross Field Balloon Observers School from Oct 1920 to Feb 1921 Commanding Officer and Commandant Ross Field Balloon Observers School from Feb 1921 to date (Nov 1921)

Flying Rating Balloon Observer March 1921 Free Balloon Pilot

Member Army and Navy Club (Wash.) Metropolitan Club (Wash.) Chevy Chase Country Club (Wash) California Club Union League Club, both of Los Angeles, Calif

Present Occupation Colonel Air Service.

Address Ross Field Arcadia, Calif

James Leroy Zimmerman

ZIMMERMAN JAMES LEROY, Homesteading born Ulysses, Nebr Jan 29 1895 son of Elbert Barton Zimmerman and Mary Celestia (Wolcott) Zimmerman married Neta Naomi Crangle June 9 1920

Educated Public school Lincoln Nebr Doane Academy Crete Nebr Doane College Casino Tech Pittsburgh Pa

Professional Commercial flying 1920 Elec Eng of Westinghouse Electric Co Mansfield Ohio, to March 1921

Aeronautical Activities Ground School, Champaign, Ill. primary flying and R.M.A., Kelly Field advanced course in combat at Issoudun France 1918-1919, ferry pilot and courier at 1st Air Depot France passenger carrying in JN4D for Clarinda Aero Co, Clarinda Iowa, 1919 1920

Flying Rating Reserve Military Aviator Dec 1919

War Service A S S R C July 1917 to Sept. 1919

Member Aero Club of America.

Present Occupation Homesteading

Address Glendo, Wyo. home 2020 S. 19 Street Lincoln Nebr

William C. Young

YOUNG WILLIAM C., Balloon Business, born, Mineral Ridge Ohio, Jan. 14 1892 son of Lewis H Young and Ida A Young

Educated Public schools of Mineral Ridge Ohio 1910 Hiram College B S 1919 University of Virginia

Professional Goodyear Tire & Rubber Co since July 1916.

Aeronautical Activities Balloon pilot 1918 Airship Pilot, 1919 Instructor, Wingfoot Lake Air Station, 1918 U S Signal Corps, 1919 1919 Aeronautical Mechanical Engineer

Flying Rating Balloon and Dirigible Pilot, Aero Club of America.

War Service: U. S Signal Corps, A M E, 1918-1919

Member Aero Club of America Akron University Club

Present Occupation Manager Aeronautical Department, Goodyear Tire & Rubber Co

Address E Market St. home 1559 Manchester Road, Akron Ohio.

Frank S. Lahm

LAHM, FRANK S. Retired, born Canton, Ohio April 25 1849 son of Samuel Lahm and Alsina Webster (Brown) Lahm married, Adelaide Way Purdy, March 1879

Educated Public schools of Canton, Ohio

Professional First exclusive dealer of American writing machines on the continent of Europe (1884)

Aeronautical Activities First American to take up ballooning as a sport first person to give a full account of what the Wright Brothers had accomplished, 1905 Nov 1908 flight in aeroplane with Wilbur Wright at Le Mans, member of the Governing Committee of the Aero Club of France since 1909 member of the Aero Club of America since formation 1907 founded the Aero Club of Ohio, American Vice President of the International Aeronautical Federation Dean of balloon pilots of the Aero Club of France

War Service One and a half year's service during the war in the Lighter-than-Air branch in Washington, D C

War Honors Decorated with Palmes academiques by the Minister of War of France

Address: 13 rue Saint Florentin Paris, France

Joseph F. Randall

RANDALL, JOSEPH F Insurance and Bonding Business born, Philadelphia, Pa. Aug 12, 1882 son of John A Randall and Mary E Randall married Anna W Foley, June 19, 1909

Educated Public schools of Phila, LL B 1917 National University

Professional Electrical contracting business, Attorney of Law

Aeronautical Activities Enlisted Oct. 12, 1917 commissioned 1st Lieut. S.R.C. Dec 1921 training at Kelly Field, flying instructor at Mineola L. I Captain Air Service when discharged in Sept 1919 commissioned Major, Jan 1920

Flying Rating Reserve Military Aviator Oct 1918

War Service Army, Oct 1917 to Sept. 1919

Member University Club City Club (Wash)

Present Occupation General Insurance and Bonding business.

Address 720 Albee Bldg., home 3146-19th Street N W, Washington, D C

Harry Leow Speck

SPECK, HARRY LEOW 1st Lieut., Air Service born Quincy Ill. July 9 1892, son of Charles M Speck and Elva B Speck.

Educated Public schools of Quincy, Ill and Spokane Wash University of Oregon and University of California. (Civil Engineering, three years)

Professional: Engineering and Horticulture from 1914 to 1917

Aeronautical Activities Commissioned 2nd Lieut and transferred to Air Service 1919 trained at Langley and Taliaferro Fields, 1918-1919, completed bombing course at Kelly Field, May 1921 flew Martin Bombers at Langley Field June 1921

Flying Rating Airplane Observer, 1919, Airplane Pilot, 1919

War Service As above.

Present Occupation 1st Lieut., Air Service.

Address Langley Field, Va., home, Medford, Ore

Charles Michael Wightman

WIGHTMAN CHARLES MICHAEL, Banking Business born St. Louis Mo. Dec. 10 1891 son of William Edward Wightman and Adela Augustina Wightman

Educated Baden School, Clay School, Yeatman School, all of St Louis

Professional Five years with the Shapleigh Hardware Co. of St. Louis two years with The Valley Bank, Phoenix Ariz.

Aeronautical Activities Training at Post Field Camp Dick and Barron Field

Flying Rating Airplane Observer, Dec 1918.

War Service Army, Dec 1917 to Feb 1919

Present Occupation: Banking.

Address Phoenix, Ariz., home, 6000 Mora Lane St. Louis Mo.

Carl A. Miller

MILLER, CARL A., Banking Business born, East Millstone, N J July 21 1891 son of August C Miller and Carolyn F Miller married, Charlotte Sanford Baker, Nov 3 1919

Educated Peekskill Military Academy B.S. 1911 New York University C E 1912 New York University

Professional One year as Assistant Instructor in Engineering in New York University, automobile business in Cincinnati Ohio 1913, American Telephone & Telegraph Co of New York 1920 Assistant Manager Business Extension Department, Irving National Bank, New York.

Aeronautical Activities Entered U S Air Service Sept 1917 and was detailed for service in the Office of the Director of Military Aeronautics at Washington as Executive Officer of the Section in Charge of Training the enlisted Mechanics Personnel for the Air Service assistant in organization of enlisted Mechanics Training School St. Paul Minn flying training April 1918 Bolling Langley and Chanute Fields continued flying at various fields until discharged from the Army

Flying Rating Reserve Military Aviator Jan 1919

War Service Commissioned 1st Lieut Signal Corps, U S Army and assigned to Air Service Sept. 1917 promoted to Captain Aug 1918 discharged Jan 1919 as Major of the Reserve Corps

Member Ardsley Club, Ardsley-on-the-Hudson

Present Occupation Assistant Manager Business Extension Department, Irving National Bank.

Address 239 Broadway home Dobbs Ferry, N Y

Charles Everett Bauch

BAUCH, CHARLES EVERETT Lieut U S N born, Dorchester Mass. May 30 1897 son of Charles A Bauch and Margaret C Bauch

Educated Mechanic Arts High School Huntington School Tufts College

Aeronautical Activities On navy submarine patrol during war later instructing in kite balloons and dirigibles assigned to Bureau of Construction and Repair Navy Department as lighter-than-air test pilot erecting and testing all new Navy lighter-than-air craft Sept. 1921 assigned to Bureau of Aeronautics as lighter-than-air test pilot

Flying Rating: Free Balloon Pilot, April 1919 Naval Aviator Italian semi rigid airship pilot No. 102

War Service U S Navy April 1917 to date flying on submarine patrol during war

War Honors Commandatore di Dirigible Esploratore (Italian)

Member, Aero Club of Massachusetts Racquet Club (Wash.)

Present Occupation Lieut U S Navy

Address Bureau of Aeronautics, Navy Department Washington, D C, home 9 Clermont St., Dorchester Mass.

Hobert Cutler Dickinson

DICKINSON HOBERT CUTLER, Physicist, born Bangor Me Oct. 11 1875 son of G Lyman Dickinson and Emma T (Cutler) Dickinson married Elizabeth Walls, July 9 1903

Educated Public schools of Alma, Nebr, Williston Seminary Easthampton Mass., B A 1900 M A 1901 Williams College Ph D 1910 Clark University

Professional U S Bureau of Standards 1903-1921 Graduate Laboratory Assistant, Assistant Physicist Associate Physicist Physicist, 1916-1921 Manager Research Department, S A E 1921 to date (Nov 1921)

Aeronautical Activities Scientific Research, power plants, truck lubricants and accessories

War Service Civilian status, in charge War Department Research.

Present Occupation Manager Research Department S A E

Address 29 West 39th Street, New York City, home, 9 Ash St., Flushing L I N Y

Hector B. Yates

YATES HECTOR B Teacher born Trenton Tenn Aug 24 1891 son of L. F Yates and Florence Callis Yates

Educated Peabody High School, Trenton Tenn Fitzgerald and Clarke School B.A. 1915 University of Tennessee

Professional Teacher in public schools, 1915-1917, teacher in South Park High School Beaumont, Tex. and Forest Avenue High School Dallas, Tex., 1919 1921

Aeronautical Activities Jan 1918 School of Military Aeronautics, Austin Tex training at Camp Dick, Penn Field, discharged Feb. 1919

Flying Rating Airplane Observer Oct 18 1919

War Service As above

Present Occupation Teacher

Address Forest Avenue High School Dallas, Tex, home, Trenton Tenn

Virginius Evans Clark

CLARK, VIRGINIUS EVANS, Engineer, born, Uniontown Pa Feb 27 1886 son of Harry Scott Clark and Sarah M (Clare) Clark, married, Rose U Stell Dec 20 1917

Educated Public schools of Uniontown Pa. 1907 U S Naval Academy Mass. Inst. of Tech.

Professional Battleship fleet around world 1908 1909 transferred to Coast Artillery, serving in Boston San Francisco and Honolulu

Aeronautical Activities Transferred to Aviation Section Signal Corps, 1910 received flying training promoted to Captain 1914 ordered to M I T for aeronautical engineering course 1915 in charge San Diego Experimental and Repair Depot 1916 Chief Aeronautical Engineer U S A served on Bolling Mission in Europe 1917 promoted to Lt. Col organized McCook Field 1918 Commanding A S Supply Depot Morrison, Va 1919-1920 Chief of Engineering Engineering Division Air Service McCook Field 1921 as Chief Engineer Dayton Wright Co., designed seaplane for aerial photographic work shipboard airplane for U S Navy and airplane and airdrome defense airplane for U S Army first officer graduated from course in aeronautical engineering M I T in charge of all army aviation engineering development and preparation of production facilities before the war designed first American battle planes U.S.A.C 1 and C 2 as Chief Engineer McCook Field responsible for the engineering capacity for all Air Service development work 1919 1920 designer of practically all U S A. Wing Sections

Flying Rating One of the oldest Army Pilots certificate dated Nov 4, 1912 Military Aviator

War Service Lt Col Regular Army Air Service entire period of war

Member Society of Automotive Engineers, University Club (Wash) Engineers Club (Dayton) Technology Club (N Y)

Present Occupation Chief Engineer, Dayton Wright Co

Address 5 Shelton Apts Dayton Ohio

Parker Dresser Cramer

CRAMER PARKER DRESSER Commercial Aeronautics born LaFayette Ind March 13 1896 son of William Homan Cramer and Fanny (Dresser) Cramer

Educated Public schools of Bradford Pa.

Professional Flickenger Iron Works Bradford Pa., 1911 1913 Dresser Mfg Co, 1914 Curtiss Aeroplane and Motor Co Buffalo, N Y 1915 1916 Standard Aero Corp., Plainfield, N J 1916 1917 Aircraft Fireproofing Corp Nutley N J 1920 Cramer Flying Field, Clarion Pa to date

Aeronautical Activities Model experiments 1908-1910 glider experiments, 1911 1912 field work, 1913 1914 mechanic in Curtiss factory 1915 1916 Production Engineer Standard Co 1916-1917 cadet, instructor and test pilot U S Army, 1917 1919 experimental and commercial flying 1919 General Superintendent, Aircraft Fireproofing Co. 1920 commercial flying at Cramer Field Clarion Pa. 1920 to date

Flying Rating: Reserve Military Aviator

War Service Dec 1917 to May 1919

Member Aero Club of America Clarion Aero Club

Present Occupation Commercial Aeronautics.

Address Cramer Flying Field, Clarion, Pa, home, E Main St. Smithport, Pa

Victor Parks, Jr.

PARKS, VICTOR Jr., Captain Air Service born, Norfolk Va Dec 7 1889 son of Victor Parks Sr and Esa Lee Parks

Educated Maury High School Norfolk, Va B S 1910, Virginia Military Institute

Aeronautical Activities Flying (pilot) A E F, French Escadrille 123 Brequet, C O American 106th Aero Squadron 1st Army

Flying Rating French Pilot, 1917, Reserve Military Aviator 1917 Airplane Pilot, 1921

War Service As above

War Honors Croix de Guerre Nov 11 1919 Army Citation, A E F Nov 1919

Present Occupation Wing Operations Officer, Kelly Field

Address Kelly Field San Antonio Tex

Wheeler Williams

WILLIAMS, WHEELER Student, born Chicago Ill Nov 9 1897 son of Lawrence Williams and Adele Holbrook (Wheeler) Williams.

Educated Chicago Latin School Phillips Exeter Academy Ph B 1919 Yale Sheffield Scientific School, Harvard Graduate School of Architecture

Aeronautical Activities Cadet course and duty as Flight Instructor in balloons

Flying Rating Aerial Observer, Oct 1919

War Service March 1918 to June 1919

Present Occupation: Student of Architecture

Address Robinson Hall, Cambridge Mass home, 50 Bellevue Place Chicago, Ill

Lorenzo Lamont Snow

SNOW LORENZO LAMONT, Captain, Air Service, born Brigham City Utah Aug 30, 1885, son of Lorenzo Snow and Minnie (Jensen) Snow

Educated Washington and Lowell Schools, Salt Lake City Utah L D S University, 1904 1908 University of Utah.

Professional Studied internal combustion engines in England France and Germany, 1906-1907 partner in design and manufacture and test of Hanson-Snow Aviation Engine Pasadena, Calif 1909-1910 owned and operated cattle ranch in Arizona 1911-1912 designed and constructed assistant in aeronautical instruments and continued study of aeronautical power plants, 1913 1915.

Aeronautical Activities Began flying training July 1916, instructor in flying, Selfridge Field 1917, 1st Asst Eng. Officer 1917, 1918 Chief Engineer Officer 1918 Ellington Field Tech Liaison Officer, July 1918 Night Bombardment, Base Sec No. 5 A E F Chief Eng Officer Paris Junction Airdrome England, Aug 1918 Commanding Officer Tangmere Airdrome Chichester, England 1918, Chief of Cooling Systems Research Power Plant Sec Engr Division, Air Service McCook Field Jan 1919 to date (Nov 1921)

Flying Rating Reserve Military Aviator, July 1917 Pilot's License Aero Club of America, No. 4097

War Service As above

Member Aeronautical Society of the Pacific Dayton City Club Aero Club of America

Present Occupation Captain Air Service Engineer Power Plant Sec Engr Div.

Address McCook Field Dayton Ohio home, 141 N Grand Ave Pasadena Calif

James Frederick White

WHITE JAMES FREDERICK, Certified Public Accountant born Brooklyn N Y Oct 10 1879 son of Charles Carroll White and Charlotte (Locke) White married Maude Seaman, July 9, 1907

Educated Brooklyn public schools 1893 New York Law School New York University School of Accounts and Finance New York State Certified Public Accountant No. 380 March 20 1912

Professional Law until 1900 Real Estate and Law to 1908 firm member Latimer Rhodes & White, Accountants 1908-1912 firm member White & Reeve Certified Public Accountants 1912 to 1917 in U S Army 1917 to 1919 1920 to date, firm member James Frederick White & Co., Certified Public Accountants

Aeronautical Activities Plattsburg Training Camp, 1917 1st Lieut. 49th Inf. 1917 Dec 1917 to Aug 1918 Personnel Officer Aviation Section Signal Corps Captain and Commanding Officer 9th Detachment A S A P Sept 1918 to July 1919 District Manager of Production Detroit, Mich. promoted to Major Air Service and discharged July 1919

War Service As above

Member Garden City Country Club Army Athletic Association American Legion Accountants Post No. 819 and Rockville Centre Post No. 309

Present Occupation Certified Public Accountant

Address 30 West 42nd Street New York City home 129 Wellington Road Garden City, Long Island N Y

George Churchill Kenney

KENNEY GEORGE CHURCHILL, Captain, Air Service born Yarmouth Nova Scotia Aug 6 1889 son of Joseph Atwood Kenney and Louise (Churchill) Kenney married Hazel Dell Richardson Oct 10 1917

Educated High school Brookline Mass 1911 Civil Engineering Mass. Inst. of Tech

Professional Civil Engineer with Quebec & Saguenay Railroad, 1911-1913 Stone & Webster Engineering Corp. 1916 President, Beaver Contracting & Engineering Corp. 1914-1917

Aeronautical Activities Cadet Mass. Inst. of Tech Ground School 1917 Hazelhurst Field L I, 1917 advanced training at Issoudun, France Dec 1917 to Feb 1918 at the front from May to Nov 1918 credited with one enemy plane on Sept. 15 1918 and another on Oct. 9 1918 commissioned Captain, Air Service, March 1919, returned to U S July 19, 1919 Border Patrol duty 1919-1920 Air Service Engineering School, McCook Field, May 1920 to Sept. 1921,

Flying Rating Reserve Military Aviator, Sept. 1917 Airplane Pilot.

War Service June 1917 to end of war

War Honors Distinguished Service Cross, Nov 1918, citation from General Pershing March 1919

Member Aero Club of America, Archie Club of Boston

Present Occupation Captain, Air Service

Address Mitchel Field, L I, N Y home, 4 Egremont Road, Boston, Mass.

The Safety of American Civil Aviation

By Otto Praeger

The very interesting study of civil aviation recently published by The National Bank of Commerce in New York brings home the painful absence in this country of statistics on civil aerial activities, save for the record kept by the government of the operations of its Air Mail Service. How serious this statistical void is, may be gathered from the impression which the article in question leaves that airplane casualties in the United States are as bad as in Great Britain or Canada, whereas the number of civilian airplane fatalities in the United States, per thousand miles flown, are perhaps one-half as great as in England or Canada.

THE ORIGINAL PLAN OF ORGANIZATION OF THE U. S. AIR MAIL SERVICE (1918). OWING TO LIMITED APPROPRIATIONS ONLY THE NEW YORK—SAN FRANCISCO ROUTE IS IN OPERATION AT PRESENT

Here are the official figures:

Canada, 422,462 miles with 5 accidents resulting in the death of one or more persons, making at least one person killed in every 84,493 miles flown.

Great Britain, 1,593,700 miles with 20 deaths, making one person killed for every 79,685 miles flown.

U. S. Air Mail, 2,000,000 miles completed March 18, 1921, with 23 deaths, making one person killed for every 94,084 miles flown.

Although the airplane fatalities per 1000 miles flown in the U. S. Air Mail Service under 34½ months under my administration are notably less than the British or Canadian record, the comparison is hardly fair to American aviation as a whole. It should be noted that the U. S. Air Mail record is for daily cross country work, winter and summer, over three bad mountain ranges, the Alleghanies, the Rockies and the Sierra Nevadas, and over a great western desert, with about 2½ hr as the average duration of flight, while the Canadian and British records are for flights of average duration in England of 19 min. and in Canada of 21 min.

The splendid performance over very great mileage of the Aeromarine company between Havana and Key West and elsewhere, and the steady operations of the contract mail service between Seattle and Victoria, B. C.—all without fatalities—to which must be added the hundreds of thousands of miles of short passenger carrying flights all over the United States, with their comparatively rare fatalities, furnish a record strictly comparable with the Canadian and English statistics.

Our lack of statistics is to blame for the impression in even well informed quarters that "In the United States the number of casualties, both in military and civil flying, is alarming." We owe it to commerce, which we seek to interest, and we owe it to the public whose good opinion we need, to maintain accurate statistical information of our widely scattered aerial activities.

It occurs to me that this can be done even in advance of legislation. Such statistics in other lines of business are gathered by the Department of Commerce without specific direction from congress, and that far reaching and efficient department of the government might be persuaded to undertake the work.

There are several reasons why it seems especially desirable that the Department of Commerce should undertake this task. It has a nation wide organization. Its requests carry the weight of government authority. But looking to the future, it would seem that there would be already in existence in a great department of the government an agency devoted to fostering commercial aviation which would require but an extension of power from congress to convert it into an arm of the government clothed with power to regulate and supervise, as well as to develop, commercial aviation.

Air Service Develops Radio Controlled Automobile

Recent visitors at McCook Field, the home of the Engineering Division of the Air Service at Dayton, Ohio, have been astonished at the gyrations of a brightly painted three-wheeled vehicle which has been dashing to and fro between the buildings and among the airplanes on the field under an visible means of control It is often seen to approach a group of persons blowing its horn wildly, and then when apparently about to strike them, to stop short with screeching brakes, back up with loudly clanging blow, make a sharp turn to the right or left, and to start off in the opposite direction. Great mystification has been shown as to the method of operation of this car, and the mystery is lessened but slightly when they learn that the movements of the car are controlled entirely by radio impulses, which are sent out from the radio station at the opposite end of the flying field. The fact that there is no aerial or antenna system visible merely adds to the mystification.

THE RADIO-CONTROLLED AUTOMOBILE DEVELOPED BY THE ENGINEERING DIVISION, AIR SERVICE, AT MCCOOK FIELD

The car is of cigar shaped construction about 8 ft long, and runs on three pneumatic tired wheels It travels at speed ranging from 4 m p h to 10 m.p.h. and the controls are so finely adjusted that it may be easily steered along a narrow road-way

An examination of the interior of the car shows an amazing and confusing collection of batteries, switches, wires, vacuum tubes, potentiometers, relays, magnetos, etc, all of which are, of course, necessary to the complete control of the apparatus. The most interesting part of the apparatus is the "selector" which is in reality the heart of the entire control system. Various combinations of dots and dashes are sent out by means of a specially constructed transmitter, each combination calling for the accomplishment of a certain operation of the control apparatus. It is the function of this selector to "decode" these various combinations of dots and dashes which are sent out, and to close the circuits to the desired controls So delicately is this selector constructed, and so rapidly will it operate, that it is possible to put into operation any one of twelve distinct controls in a period of less than one second. That is to say, less then one second elapses from the time any push button on the automatic transmitter at the distant radio station is pressed until the control on the car is in operation Such speed of control has never before been accomplished. This car has been controlled equally well from an airplane and from a ground transmitting station.

The possibilities of radio control and its application to war time problems are almost without number Radio control can be applied to any mechanical apparatus that moves, whether it be in the air, on the ground, on the surface of the water, or beneath the water Huge land tanks may be constructed and filled with T N T and driven to any desired point along the enemy's lines where the explosive can be fired by means of radio, or it can be applied in a similar manner to a boat, submarine, torpedo, or even an airplane.

Resumption of Recruiting for Air Service

The Air Service is in immediate need of over 3,000 enlisted men to fill existing vacancies, and authority for the procurement of these recruits was contained in a letter from The Adjutant General of the Army which outlined the procedure to be followed in securing recruits.

Recruiting will again be conducted under the direction of Corps Area Commanders Under this plan the Air Officer is the representative of the Chief of Air Service for all matters pertaining to recruiting for the Air Service within the corps area, and therefore the successful solution of the present recruiting problem is directly in the hands of the Air Officer. Each Corps Area Air Officer and the Commanding Officer of Bolling Field, Anacostia, D. C, has been directed to submit on Dec. 31, 1921, a detailed report concerning recruiting activities for the Air Service within the corps area or district. Certain quotas have been assigned to various corps areas, but as these do not take into consideration current losses through discharge, it will be necessary from time to time to increase those quotas to compensate for such losses.

The distribution of the authorized strength of the Air Service by organization is as follows·

Organization	Strength of Organization	Number of Organizations	Total Strength
Wing Headquarters	20	1	20
Group Headquarters (H/A)	35	6	210
Group Headquarters (L/A)	18	1	18
Squadrons	132	25	3300
Squadrons (R S)	90	10	900
Balloon Companies	130	3	390
Balloon Companies (Coast Defense)	100	8	800
Airship Companies	130	6	780
Air Parks	172	10	1720
Branch Intelligence Offices	5	5	30
Air Offices Casual Detachments	4	6	24
Photo Sections	20	13	200
Field Officers School	96	1	96
Photo School	51	1	51
Airship School	150	1	150
Pilot School	500	1	500
Gunnery Detachment	75	1	75
Mechanics School	100	1	100
Observation School	400	1	400
Balloon School	150	1	150
Flying Cadets		..	275
Communications School	50	1	50
			10,300

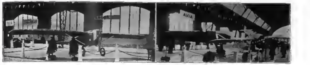
The following vacancies for enlisted men now exist at Air Service stations

	Heavier-than-Air	Lighter-than-Air
Mitchell Field, N. Y	479	
Aberdeen, Md	3	33
Lee Hall, Va.	.	84
Langley Field, Va	168	206
Montgomery, Ala. Air Intermediate Depot	33	
Carlstrom Field, Arcadia, Fla.	305	
Camp Knox, Ky	55	
Scott Field, Belleville, Ill		87
Chanute Field, Rantoul, Ill.	076	
Fort Riley, Kansas	110	
Brooks Field, San Antonio, Texas		156
Ellington Field, Houston, Texas	296	
Kelly Field, San Antonio, Texas	443	
Post Field, Fort Sill, Okla.	4	91
Rockwell Field, San Diego, Calif	5	
March Field, Riverside, Calif	113	For duty in Hawaii
Bolling Field, Anacostia, D. C	95	

Course for Enlisted Men at Communication School

A new class for enlisted men, with 25 attending was opened at the communications school Fort Sill, Okla., on Oct. 17. This course will last for three months. It is a combined radio operators' and radio mechanics' course. Graduates will be qualified for both ratings.

Second Prague Aero Show



LEFT ARDEA BP1 (70 HP. MERCEDES) SCHOOL MONOPLANE RIGHT IN FOREGROUND AVIA BH3 (185 HP. BMW) PURSUIT MACHINE, IN BACKGROUND AVIA BH1 (50 HP GNOME) SPORT TWO-SEATER

The second aero show organized by the Czechoslovak Aero Club under the patronage of the president of Czechoslovak Republic, Dr Thomas G Masaryk, took place from Oct 22 to 30, last, at the Palace of Industry, Prague, which has a surface area of 100,000 sq ft

Owing to the active assistance of the government, the participation of numerous local and foreign aircraft manufacturing firms and the interest displayed by the public, the show proved a great success. The exhibition was opened by the minister of public works Tuceny, who emphasized in his inaugural address that the Czechoslovak government would spare no effort in the development of a self-supporting national aircraft industry As a proof of this policy, the exhibition was visited by President Masaryk together with several cabinet ministers, generals, and other officials of the government

It is the intention of the Czechoslovak government to make of their country the leading air power among the new countries of Central Europe. Judging by the two samples of Czechoslovak airplanes illustrated herewith, this plan seems to be well on the way toward its ultimate goal.

Following is a list of the aircraft firms which exhibited machines at the second Prague Aero Show

The Compagnie Franco-Roumaine de Navigation Aérienne which is running the air transport service on the Paris—Strasbourg—Prague—Warsaw route exhibited a Blériot-Spad commercial airplane fitted with the 260 hp Salmson engine.

The Societa Anonima Fiat of Turin exhibited a 300 hp radial 9 cylinder engine and a 400 hp eight V type cylinder engine

The Aero aircraft works of Prague exhibited the Ae.0.2 pursuit plane, designed by Vlasak-Husnik, (220 hp Hispano-Suiza), the Ae.0 3 pursuit plane designed by Engineer Rösner (Hispano-Suiza) and the Ae 0 4 pursuit plane designed by Vlasak-Husnik (185 B M W)

The Avia Works of Prague-Vysocan exhibited a sporting monoplane two-seater Avia B H 1 fitted with a 48 hp Gnome, a sporting monoplane Avia B H 2 fitted with a 20 hp engine and a pursuit monoplane Avia B H 3, fitted with a 185 hp. B M W engine

The Military Aircraft Works of Prague-Gbely exhibited the two-seater fighter biplane Sm 2 (designed by Smolik) fitted with a 260 hp Maybach engine

The Ardea factory exhibited the school monoplane B P 1. fitted with 70 hp Mercedes engine

Foreign Aeronautical News

Czecho-Slovakia

Prague is slowly but surely becoming an air port of some importance, a position to which her geographical situation would appear to entitle her. The airdrome is situated at Kbely, a small village on a plateau to the northeast of Prague, forming a splendid natural site for an airdrome. It is here that the machines from Paris, which depart from LeBourget at six in the morning, arrive at about two o'clock in the afternoon leaving again for Paris the next morning at 11 a. m.

England

In accordance with plans approved a year or more ago official steps, it is stated, are being taken toward replacing the greater part of the army of occupation in Mesopotamia by units of the Royal Air Force. This will not only tend to save the government many millions a year in expenditures for the army, but will afford a great object lesson in the value of aircraft in carrying out the almost purely police duties of an army of occupation.

France

For some time it has been the intention of the Franco-Roumanian Aviation Co., who operate the Paris-Strasbourg-Prague-Warsaw air line, to extend their line to Budapest and Constantinople. On October 22 the first direct flight was made to Bucharest, and occupied 14 hr., including the stops at Strasbourg, Prague and Budapest. By train the journey occupies about 68 hr., so that the saving effected is very considerable. For the extension to the Turkish capital, a new machine has been ordered, one of the four-engined Bleriot 845 types which was exhibited at the Paris show. The new machine is stated to have accommodation for sixteen passengers with baggage and to have an average speed of 120 m. p. h.

Encouraged by the success attained during the Gordon Bennett competition in the Rhon hills this year, France has resolved to hold, next year, a somewhat similar competition. At present it is proposed to hold the competition from July 6 to 20, 1922. The competition is to be organized by the French Aerial Association.

France is gradually turning the port of Antibes into an important air station, and it is hoped to establish air lines running to Corsica, Sardinia and Tunis, using Antibes as the French terminus. On Oct. 18 a seaplane flew from Antibes to Corsica (Ajaccio) in 3 hr. and 10 min., which is a very great saving of time as compared with the time taken by steamers.

Italy

A regular aerial service has been established by the colonial government of Libia between the cities of Tripoli and Homs. The airplanes used belong to the Army and are part of the aerial force stationed in the Colony. Airplanes of the Caproni 450 type are used for transporting passengers and the S.V.A. 10 types are used for transporting mail. The distance between these two cities is only 100 kilometers.

The safety of commercial aviation in Italy is illustrated by the official report of the activities of the Civil Aerial Transport Company (Societa Anonima Imprese Aeree) covering the first years of its operation from June 1, 1920, to June 1, 1921. A total of 996.11 hr. were flown over a distance approximately 62,000 mi., 3,351 passengers being carried without accident. This line did not operate during the months of December and January. The greatest number of passengers (591) were carried in July, 1920, followed by September with 520, and the lowest number carried during any month (138) was in March 1921. Passenger traffic was heaviest during the summer months.

Mexico

A recent newspaper dispatch reports that the Mexican aviator Jorge Pulido made a flight from Ciudad Juarez to Tampico in an Italian Ansaldo plane, carrying six passengers.

Three Lincoln Standard planes have recently been set up, and it is reported that they are intended for mail service and the transportation of passengers between Mexico City and Tampico. These planes will be used by the Mexican Aerial Transportation Co.

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